

## Management Indicator Species for the New Plan

Success in maintaining and restoring composition, structure, and function of forest ecosystems within desired ranges of variability is reflected by both changes in forest condition and by levels of management and other effects that are shaping these communities. Monitoring will include tracking the abundance of major forest cover/community types and levels of management activities conducted to maintain and restore desired conditions. Population trends and habitats of Management Indicator Species will be monitored to help indicate effects of national forest management within selected communities.

**Indicator:** Swainson's Warbler (*Limnothlypis swainsonii*)



From USGS Patuxent Bird ID InfoCenter

**Reasons for Selection:** To indicate trends in early-successional riparian areas, the Swainson's warbler is selected to represent early-successional riparian habitats in the Piedmont (Oconee NF). It is strongly associated with canebrakes, tangles, and thick shrubby under stories of open bottomland hardwoods and mixed forests.

### Ecology & Life History

**Basic Description:** A small bird (ground-feeding warbler).

**Reproduction Comments:** Eggs are laid late April or May through July. Clutches have been reported ranging from two to five eggs, but usually number three, with four rare and five very rare (Bent 1953). Whether or not two clutches per season is ordinary is controversial. Meanley (1971) reported observing birds laying two clutches. Clawson and Thomas (no date) doubted that they routinely

attempt second broods, based on comparisons with closely related species. Incubation by female is 13 to 15 days, and young remain in the nest 10 to 12 days and accompany parents for two to three weeks more (Meanley 1971, Clawson and Thomas, no date).

Reproductive success was low at nests observed by Meanley (1971) in coastal plain habitat. He reported that only three of 16 nests (which he was "reasonably sure" he had not disturbed) were successful. Cowbird parasitization was the cause of at least three failures. Common grackles (*QUISCALUS QUISCULA*) and blue jays (*CYANOCITTA CRISTATA*) also robbed nests. Snake predation was also documented. Meanley concluded (1971) that "In the Coastal Plain part of its range the Swainson's Warbler would probably have a difficult time maintaining its present population level."

One instance of apparent polygyny with aggregated nest placement was recently reported in the literature (Graves 1992). Knowledge of how common such behavior is would be useful in estimating population size from singing male counts.

## **Ecology Comments**

**POPULATION DENSITY:** Little quantitative information on population density has been published, and most has apparently been records of remarkably high densities, so that virtually nothing is known about average densities. Meanley (1971) reported the highest densities recorded in a 2.8 ha tract cane stand in Georgia (1.8 singing males per hectare in 1963). This population declined to 0.4 males per hectare in 1968. In the scrub palmetto habitat of Bayou Boeuf Swamp, Louisiana, density was 0.25 territorial males per ha (Meanley 1971). In 1991, Graves (1992) recorded about 0.17 singing males per ha at Whiskey Bay Pilot Channel of the Atchafalaya River, St. Martin Parish, Louisiana. Dickson (1977) reported a density of 0.25 males per ha in an oak-gum stand in Louisiana. Density is also reflected by transect counts. Meanley (1971) reported that on one 0.8 km transect he counted eight territorial males (10 per km) in the Dismal Swamp, Virginia. It is not clear whether this transect was representative or exceptional, but on another 5.2 km transect in the Dismal Swamp, he found only eight territorial males in sweet pepperbush-greenbrier undergrowth (1.5 per km). Near Macon, Georgia he reported 19 singing males along a 5.2 km transect through Bond Swamp (3.6 per km).

Density is expected to vary inversely with territory size. Predictably, territory size varies with quality and continuity of habitat. Meanley (1971) summarized the literature on known territory size. Territories ranged from as little as 0.12 ha in the canebrake habitat of the Ocmulgee River bottom in Georgia, to nearly two ha in the Dismal Swamp of Virginia. The average size of a total of 87 territories in giant cane patches near Macon, Georgia was about 0.4 ha. Graves (1992) observed that territories are exceptionally large in relation to most other wood

warblers, and males defend their territories for a long period of the year (early April to early July and sometimes later).

**POPULATION ESTABLISHMENT AND MAINTENANCE:** The males tend to return to the same territory in successive years. Meanley (1971) reported one instance of a male found in the same territory for five seasons, and another for three successive years.

The southern Appalachian population was not discovered until the 1930s (Bent 1953). This population is generally thought to be a new extension of the range from the coastal plain population. Morse (1989) cites "the apparent rapid increase of the species in the Appalachians" as well as the fact that the warbler is "vocally conspicuous" to support this claim. Morse (1989) suggests that the supposed habitat expansion into the mountains is one reason this warbler has recovered while Bachman's warbler, thought to be a strict canebrake specialist, has not. Wintering warblers are divided into two fairly discrete populations, those that normally winter in the West Indies, and those that normally winter on the Yucatan Peninsula. However, birds from each population have been reported wintering in the other location at times. This may allow occasional formation of new wintering populations (Lack and Lack 1972, Morse 1989). It may also allow one subpopulation to serve as a refugium for the other when one area suffers a population decline. This flexibility in wintering habitat choice may be another reason why this warbler has survived while Bachman's warbler (*VERMIVORA BACHMANII*), which winters only in the West Indies, has continued to decline (Morse 1989).

**Long Distance Migrant:** Y

**Migration Comments:** Some migrants apparently fly across Gulf, others around it. Migrates through coastal eastern Mexico. Earliest migrants reach the southern U.S. usually by late March or early April. Most depart from breeding areas in Arkansas and Georgia by mid-September (Meanley 1971).

**Palustrine Habitat(s):** FORESTED WETLAND, RIPARIAN

**Terrestrial Habitat(s):** FOREST - CONIFER, FOREST - HARDWOOD, FOREST - MIXED, SHRUBLAND/CHAPARRAL, WOODLAND - CONIFER, WOODLAND - HARDWOOD, WOODLAND – MIXED.

**Habitat Comments: BREEDING:** Rich, damp, deciduous floodplain and swamp forests; requires areas with deep shade from both canopy and under story cover (Meanley 1971, Bushman and Therres 1988). On the coastal plain, occurs in the shadiest parts of the forest, with dense upper canopy, lower canopy and shrubs, and little herbaceous cover. The shrub stratum is often nearly mono-specific stands of giant cane (*ARUNDINARIA GIGANTEA*) in floodplain forest; sweet pepperbush or fetterbush in swamps at the northern end of range such as the

Great Dismal Swamp in Virginia and Pocomoke Swamp in Maryland and Virginia and headwater swamps of the Atlantic Coastal Plain; or scrub palmetto in bottomlands. Graves' (2001) data suggested "a preference for early successional forest in the current landscape or disturbance gaps in primeval forest." In the mountains, moist lower slopes of mountain ravines at elevations to 900 m are preferred, and a shrub layer of rhododendron is most common (Bent 1953, Meanley 1971, Hooper and Hamel 1979). Individuals were found primarily in sawtimber and to a lesser extent in pole stands of second-growth cove forests in the Southern Appalachians (Hooper 1978). Although often reported to inhabit canebrakes in the literature, it is clearly not exclusively a cane species; structure of the habitat - both over story and dense shrub under story canopies characteristic of successional forests - is apparently of primary importance, and a variety of shrubs will do (Graves 2001).

There are few quantified descriptions of habitat. Graves (2001) found that territories in Great Dismal Swamp were characterized by extensive under story thickets (median of 36,220 small woody stems and cane culms per hectare), frequent greebriar tangles, deep shade at ground level and an abundance of leaf litter overlying moist organic soils. These sites occurred most frequently in relatively well-drained tracts of broad-leaf forest that had suffered extensive canopy damage and wind throw (Graves 2001). Meanley (1971) noted that as of 1968 there were still some sections in the Ocmulgee floodplain forest (near Macon, Georgia) "where canebrakes, nearly uninterrupted, covered 1-sq mile areas." He recorded densities of cane poles of about 50,000 per ha, averaging five m high, and some reaching to 10 m. In Monkey John Swamp in South Carolina, Meanley recorded 90% canopy coverage ("density"). The scrub palmetto under story averaged about one m in height, with about 20,000 plants per ha.

Eddleman et al. (1980) provide another quantified look at habitat characteristics in southern Illinois in the Shawnee National Forest. Some of their conclusions differ from those of Meanley. Eddleman et al. (1980) found that the species composition of over story varied widely among territories and concluded that it had little effect on habitat selection. However, a substantial majority of the birds in their study nested in soft-mixed hardwoods (25 of 36). While the majority of singing males in their study were in forest with over story trees over 20 yr old, they were found in habitats ranging from late successional old fields with dense shrubs and surrounded by mature forest, to late successional forest. Figures on the frequency of territories falling in each stage were not given. Meanley (1971) noted a few cases where they were found in what he deemed to be marginal habitat (mostly drier areas). He attributed these cases to areas where the warblers were locally common, and the population "spilled over" from optimum to marginal habitats. This is a possible explanation for the discovery of this warbler in unlikely habitat such as late-successional old fields.

In the Eddleman et al. (1980) study, individuals were never found in habitat with trees less than 7.6 m tall. Canopy coverage was always greater than 55%, and usually greater than 75%. Shrub stems (mostly cane) averaged over 26,000 stems/ha in their study, compared to nearly twice that in a study by Meanley (1966) in Georgia. These Illinois birds were only found in sites where soils were alluvial silts and clays. Male territories were limited to forest tracts at least 350 ha in size, and birds were always found within 200 m of water.

Eddleman et al. (1980) concluded that younger cane stands are needed, that cane needs openings to regenerate and that logging can be used to create openings to manage canebrake habitat. These conclusions have not been corroborated by follow-up studies. And apparently, no further studies characterizing habitat in other locations have been published. Results of timber cuts in warbler habitat in the Shawnee and South Carolina are described under Management Requirements.

While most accounts agree that this ground-foraging bird prefers areas with little to no live ground cover, accounts of the mid-story of the forest vary. Burger (pers. comm.) reports that they are found in cane stands within forests with good over story, and no mid-story, while Meanley (1971) reported three layers to the forest canopy. Nests in under story canes, shrubs, vine tangles, and similar sites, 0.5-3 m above ground, typically within about 200 m of open water, near the edge of a cane stand rather than in the densest part (see Bushman and Therres 1988). In Missouri, all of 29 territories and 16 nests that were found were in stands of cane (Figg 1993).

**NON-BREEDING:** In winter probably occurs in undergrowth of mature forest. It has been suggested that the loss of cane habitat in Cuba has been detrimental to wintering populations (Morse 1989). While this may be true, the birds also occur in upland forest with moderate leaf litter in Peninsula de Zapata, Cuba (Hamel, pers. comm.).

**Food Habits:** INVERTIVORE

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